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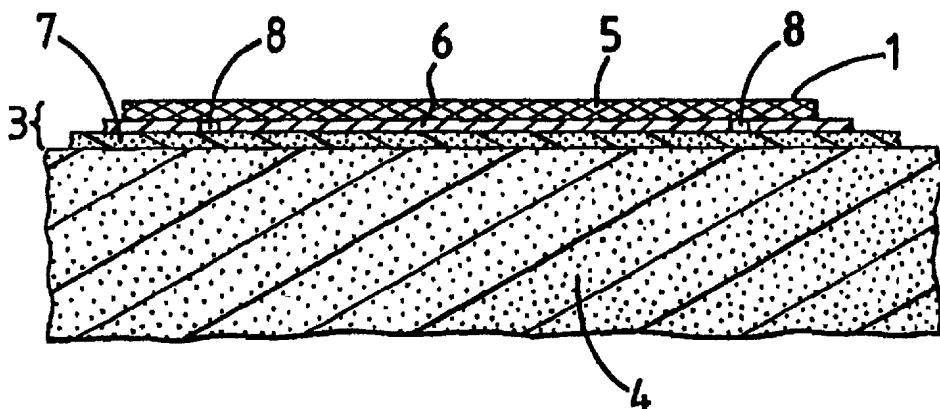


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(54) Title: SPONGES



(57) Abstract

A sponge for cleaning motor-vehicles includes a thick slab (4) of sponge material which is backed by a laminate (3) that includes a water-impervious plastics sheet (6). The sheet (6) is sandwiched between a fabric sheet (5) forming the upper surface (1) of the sponge, and a thin layer (7) of plastics foam that is bonded to the foam slab (4). The sheet (6) is holed, being punctured with holes (8) through the fabric sheet (5), to enable water to pass to a restricted extent from the foam slab (4) to the fabric sheet (5). The distribution of the holes (8) in the sheet (6) may vary from region to region of the sponge.

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**Sponges**

This invention relates to sponges, and is especially concerned with sponges for use in cleaning motor vehicles, and methods of manufacturing them.

According to one aspect of the present invention there is provided a sponge wherein a body of sponge material is backed by a laminate that comprises a water-impervious layer beneath a fabric layer, and the water-impervious layer is holed to enable liquid to pass to a restricted extent through it from said body to the fabric layer.

According to another aspect of the present invention there is provided a method of manufacturing a sponge wherein a body of sponge material is backed by a laminate that comprises a water-impervious layer beneath a fabric layer, and the water-impervious layer is punctured to enable liquid to pass to a restricted extent through it from said body to the fabric layer.

The water-impervious layer may be a plastics film, for example of polyvinyl chloride or polyurethane, and the fabric layer may be, for example, of polyester or other man-made fibre, cotton, chamois leather or cloth similar thereto.

The laminate may involve the water-impervious layer sandwiched between the fabric layer and a layer of sponge material that is bonded to the sponge-material body.

The sponge material may be a polyester or polyether foam.

Two forms of sponge for use in motor-car cleaning, and a method of manufacture applicable thereto, all in accordance with the present invention, will now be

described, by way of example, with reference to the accompanying drawings, in which:

Figure 1 shows a first of the sponges in plan view;

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Figure 2 shows the sponge of Figure 1 in side elevation;

Figure 3 is a sectional side-elevation of the sponge of Figure 1 to enlarged scale; and

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Figure 4 is plan view of the second sponge according to the invention.

Referring to Figures 1 and 2, the first sponge to be described is of elongate slab form having a substantially constant thickness of some 50 mm throughout, and a backing surface 1 that is printed with a perspective, colour view 2 of a motor vehicle. The sponge is configured in length and width to the general outline of 20 the view 2, for novelty effect.

The surface 1 is the upper surface of a three-layer laminate 3 that backs a slab 4 of open-cell polyester or polyether foam forming the main sponge body. The three 25 layers of the laminate 3 are illustrated individually in Figure 3 to which reference will now be made.

Referring to Figure 3, the laminate 3 consists of an upper sheet 5 of polyester fabric, and a film 6 of 30 polyvinyl chloride or polyurethane that is sandwiched between the sheet 5 and a lower sheet 7 of polyester or polyether foam. The foam sheet 7 is bonded to the slab 4 so that the laminate 3 backs the slab 4 with the fabric sheet 5 outermost.

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The fabric sheet 5 provides a comfortable and pleasing feel for the hand stretched across the surface 1 in

gripping the sponge during use. The slab 4 soaks up a large quantity of water when it is immersed and retains a substantial proportion of this when it is removed from the water; the fabric sheet 5, in contrast, retains little. Furthermore, when the slab 4 is applied to wipe over and clean bodywork of a motor vehicle or some other work surface, pressure of the hand on the sponge in this action, causes some of the water retained by the slab 4 to be discharged down onto the work surface to wash away the dirt.

With a normal, unbacked sponge consisting simply of a slab of foam, hand pressure causes the retained water to be released both ways, up and down, through the thickness of the sponge. A significant proportion of the retained water is thus lost from effective use in washing dirt away from between the work surface and the sponge. Dirt accordingly tends to be retained under, and even to migrate into, the sponge so as to scratch the work surface as the sponge is moved across that surface.

With the sponge of the present invention, however, water is restricted from release upwardly by the film 6 of the laminate 3, so a higher proportion of the water retained by the sponge is released downwardly, than otherwise would be the case. Thus, the present sponge is more efficient in use of the retained water for washing dirt from the work surface. Release of water upwardly from the slab 4 is not totally precluded however, in that the film 6 is punctured by small holes 8.

The holes 8 ensure that some water is discharged from the slab 4 into the fabric sheet 5 when the sponge is squeezed. This enables the sheet 5 to be used for cleaning where a degree of body and extra pressure in the rubbing operation is required, the sponge then being held with the slab 4 in the palm of the hand and the sheet 5

against the work surface. Such cleaning is most conveniently carried out by gripping the sponge in the hand and pressing it down with one or the other of the two ends of the sheet 5 contacting the work surface under pressure exerted on the slab 4 by the extended index finger. The sheet 5 is kept wet for lubrication in the region of rubbing contact by water supplied through the holes 8 from the reservoir of water held by the gripped slab 4. Since the contact is most conveniently made with the work surface at either end of the sponge, more holes 8 are provided at the ends than in the middle.

Although the holes 8 may be uniformly distributed throughout the sheet 6, variation in distribution enables greater efficiency of water use, and therefore cleaning, to be achieved. The holes 8 may, for example, be spaced apart by 10 mm in one region and by 30 mm in another, and may be provided in one case in two-dimensional groupings and in single-file lines in another.

The sponge is manufactured by first forming the laminate 3. For this a thin, unpunctured film of polyvinyl chloride or polyurethane is sandwiched between sheets 5 and 7 of fabric and foam respectively. The foam has a thickness of some 2 mm, and the film and two sheets are heat bonded together by heating the film so that it is to some extent melted as the sandwich is passed through pressure rolls. The view 2 is now printed onto the fabric upper surface 1 of the laminate; the foam sheet 7 adds body to the fabric for this process, and the laminate form ensures that the printing is not distorted in the finished product.

The finished laminate is now bonded to an appropriately-thick slab 4 of foam. The bond between the thin sheet 7 of foam and the slab 4 is preferably achieved by flame-welding or -lamination, but may be brought about by

spraying a contact adhesive onto the mating surfaces and then bringing the two foam surfaces into contact with one another. The resultant product is then cut to the required configuration, and submitted to a spiked roller 5 or other tool for puncturing the film at appropriate locations, through the fabric sheet 5, to form the holes 8.

The sheet 5 is preferably of polyester fibre or other 10 man-made fibre having low water-retention characteristics. A higher degree of water retention may be desired, however, in certain cases, and in this respect the sheet 5 may instead be of cotton or of chamois leather, or of a cloth similar to chamois leather 15 in its water retention properties.

The configuration of the sponge may include features to assist further in the cleaning process. A sponge having the same construction as that of the sponge of Figure 1, 20 but configured to include features of this nature, is illustrated in Figure 4 and will now be described.

Referring to Figure 4, the elongate sponge in this case is configured with a series of grooves 9 extending 25 through its thickness opposite a concave longitudinal edge 10, making the sponge comfortable to hold squeezed slightly in the palm of the hand with the thumb against the edge 10 and fingers engaged in individual grooves 9. The index finger may be extended lengthwise of the sponge 30 for exertion of downward pressure, and the slight squeezing of the sponge then tends to push it up around the index finger to afford some protection to that finger.

35 The two end edges 11 and 12 of the sponge are configured to provide blunt-nose and convex rubbing surfaces respectively. These surfaces may be utilised effectively

also when holding the sponge at the concave edge 10, as may the grooves 9 for cleaning grilles and similar areas of the vehicle body.

- 5     Although the invention has been described above in the context of sponges for use in cleaning motor vehicles, it is not limited to this. The invention may be applied to sponges for use generally, for example in washing the person, and can be printed and/or configured
- 10    appropriately for such application.

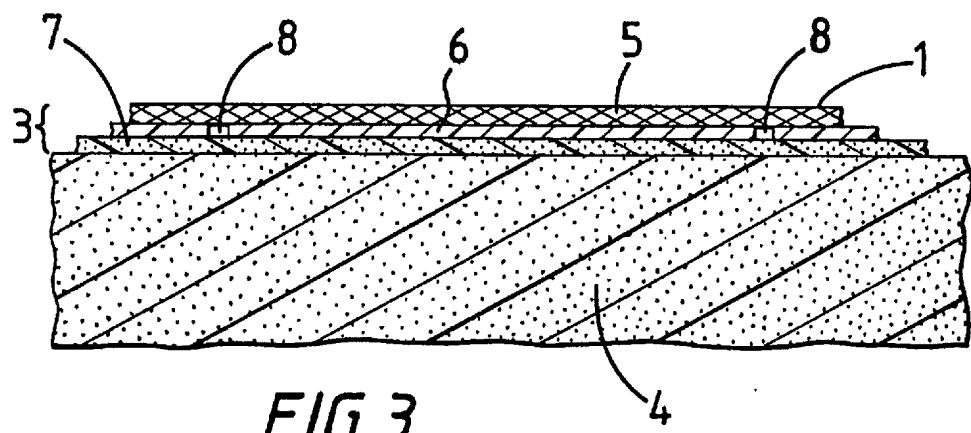
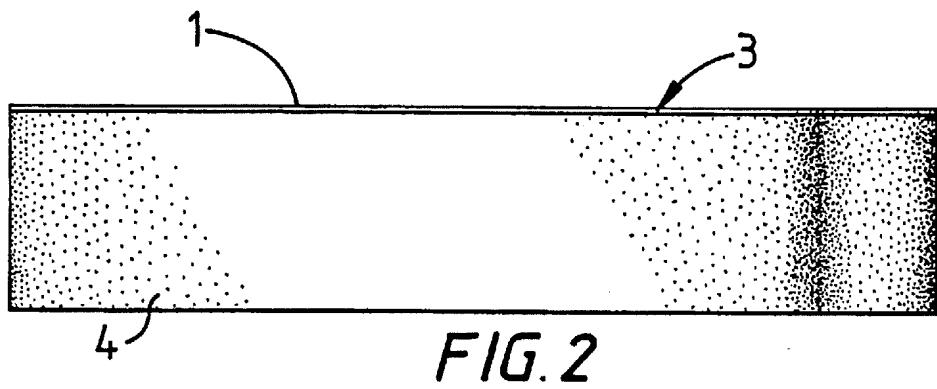
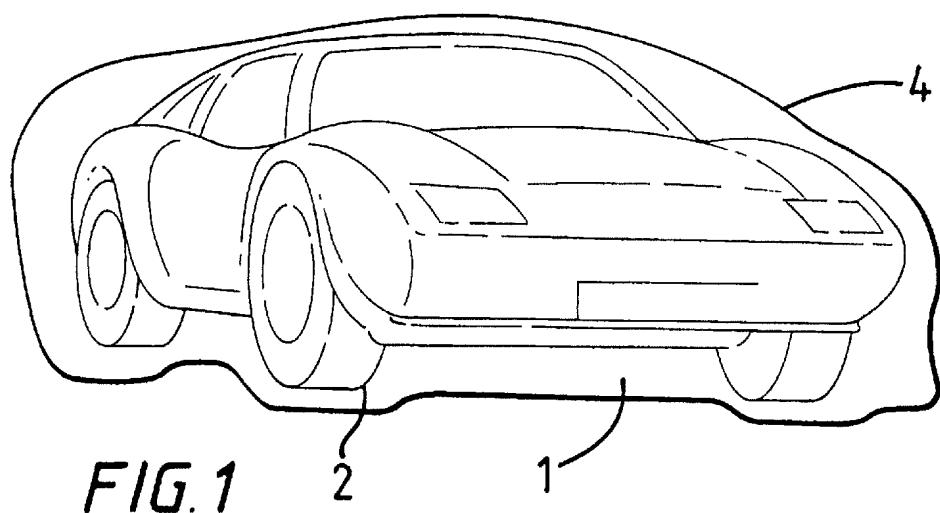
**Claims:**

1. A sponge wherein a body of sponge material is backed by a laminate that comprises a water-impervious layer beneath a fabric layer, and the water-impervious layer is holed to enable liquid to pass to a restricted extent through it from said body to the fabric layer.
2. A sponge according to Claim 1 wherein the water-impervious layer is a plastics film.
3. A sponge according to Claim 2 wherein the water-impervious layer is a film of polyvinyl chloride or polyurethane.
4. A sponge according to any one of Claims 1 to 3 wherein the holes in the water-impervious layer are non-uniformly distributed throughout the sheet.
5. A sponge according to any one of Claims 1 to 4 wherein the fabric layer is of polyester or other man-made fibre.
6. A sponge according to any one of Claims 1 to 5 wherein the water-impervious layer is sandwiched in the laminate between the fabric layer and a layer of sponge material that is bonded to said body.
7. A method of manufacturing a sponge wherein a body of sponge material is backed by a laminate that comprises a water-impervious layer beneath a fabric layer, and the water-impervious layer is punctured to enable liquid to pass to a restricted extent through it from said body to the fabric layer.
8. A method according to Claim 7 wherein the water-impervious layer is a plastics film.

9. A method according to Claim 7 or Claim 8 including the steps of sandwiching the water-impervious layer between the fabric layer and a layer of sponge material to form the laminate, and then bonding this latter layer to said body.

10. A method according to any one of Claims 7 to 9 wherein the water impervious layer is holed by puncturing it through the fabric layer after said body has been backed by the laminate.

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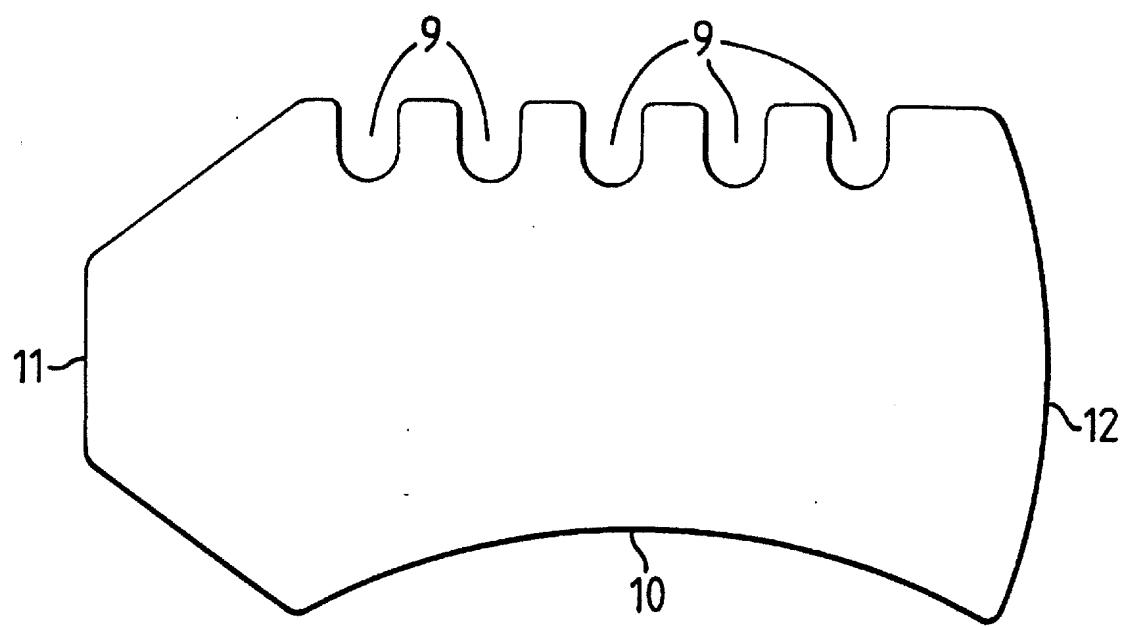


FIG.4

**INTERNATIONAL SEARCH REPORT**

International Application No  
PCT/GB 95/01160

**A. CLASSIFICATION OF SUBJECT MATTER**  
IPC 6 A47L13/16

According to International Patent Classification (IPC) or to both national classification and IPC

**B. FIELDS SEARCHED**

Minimum documentation searched (classification system followed by classification symbols)  
IPC 6 A47L

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	FR,A,2 653 059 (MINNESOTA MINING & MFG CY) 19 April 1991 see page 3, line 9 - page 16, column 19; figures ---	1-10
Y	EP,A,0 066 463 (UNILEVER PLC) 8 December 1982 see page 2, line 29 - page 9, line 29; figures ---	1-10
Y	DE,A,28 28 055 (HENKEL KG) 10 January 1980 see page 9; figures ---	1-10

Further documents are listed in the continuation of box C.

Patent family members are listed in annex.

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Date of the actual completion of the international search

16 October 1995

Date of mailing of the international search report

30.10.95

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International Application No  
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## C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	PATENT ABSTRACTS OF JAPAN vol. 10, no. 103 (C-340) 18 April 1986 & JP,A,60 233 176 (DAIMATSU KAGAKU KOGYO KK) 19 November 1985 see abstract -----	1

# INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/GB 95/01160

Patent document cited in search report	Publication date	Patent family member(s)		Publication date
FR-A-2653059	19-04-91	NONE		
EP-A-0066463	08-12-82	AU-B-	553286	10-07-86
		AU-B-	8429882	09-12-82
		CA-A-	1211603	23-09-86
		JP-C-	1779669	13-08-93
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		JP-A-	57210848	24-12-82
		US-A-	4515703	07-05-85
DE-A-2828055	10-01-80	NONE		